

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~striketrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please AMEND claim 20, in accordance with the following:

1. (PREVIOUSLY PRESENTED) A method for determining a type of disc in an optical disc recording/reproducing device comprising a photodetector divided into at least two light receiving sections in a radial direction, comprising:
 - generating a radial push-pull signal from a difference between light receiving signals from a disk and received by the at least two light receiving sections, wherein the disk comprises one of a first disk and a second disk;
 - detecting an upper envelope signal and a lower envelope signal from the radial push-pull signal;
 - detecting a phase difference between the upper envelope signal and the lower envelope signal; and
 - distinguishing the first disk from the second disk according to a magnitude of the phase difference, wherein the second disk comprises a density higher than the first disk.
2. (PREVIOUSLY PRESENTED) The method as recited in claim 1, wherein the distinguishing determines the first disk if the phase difference is greater than or equal to a reference phase difference.
3. (PREVIOUSLY PRESENTED) The method as recited in claim 1, wherein the distinguishing determines the second disk if the phase difference is less than a reference phase difference.
4. (PREVIOUSLY PRESENTED) The method as recited in claim 1, further comprising
 - receiving the magnitude of the phase difference and the light receiving signals and outputting servo error signals;
 - using the servo error signals to output a voltage to drive a spindle motor of the disk.

5. (PREVIOUSLY PRESENTED) The method as recited in claim 1, further comprising

- generating a first track cross signal from an envelope of an RF SUM signal, wherein the RF SUM signal is obtained by adding the light receiving signals;
- generating a second track cross signal from an envelope of the radial push-pull signal;

and

- selectively outputting one of the first track cross signal and the second track cross signal according to the distinguishing of the first disk from the second disk.

6. (PREVIOUSLY PRESENTED) The method as recited in claim 1, further comprising

- comparing the upper envelope signal with a predetermined threshold prior to detecting the phase difference; and
- binarizing the upper envelope signal prior to detecting the phase difference.

7. (PREVIOUSLY PRESENTED) The method as recited in claim 1, further comprising

- comparing the lower envelope signal with a predetermined threshold prior to detecting the phase difference; and
- binarizing the lower envelope signal prior to detecting the phase difference.

8. (PREVIOUSLY PRESENTED) A method, comprising:

- detecting a phase difference between an upper envelope signal and a lower envelope signal from a radial push-pull signal, wherein the radial push-pull signal is a difference between at least two light receiving signals from a disk and received by at least two light receiving sections in a photodetector, wherein the disk comprises one of a first disk and a second disk;

and

- distinguishing the first disk from the second disk according to a magnitude of the phase difference, wherein the second disk comprises a density higher than the first disk.

9. (PREVIOUSLY PRESENTED) The method as recited in claim 8, wherein the distinguishing determines the first disk if the phase difference is greater than or equal to a reference phase difference.

10. (PREVIOUSLY PRESENTED) The method as recited in claim 8, wherein the distinguishing determines the second disk if the phase difference is less than a reference phase difference.

11. (PREVIOUSLY PRESENTED) The method as recited in claim 8, further comprising

generating a first track cross signal from an envelope of an RF SUM signal, wherein the RF SUM signal is obtained by adding the light receiving signals;

generating a second track cross signal from an envelope of the radial push-pull signal; and

selectively outputting one of the first track cross signal and the second track cross signal according to the distinguishing of the first disk from the second disk.

12. (PREVIOUSLY PRESENTED) A method, comprising:

obtaining a magnitude of a phase difference between an upper envelope signal of a radial push-pull signal and a lower envelope signal of the radial push-pull signal and determining a type of disk therefrom.

13. (PREVIOUSLY PRESENTED) The method as recited in claim 12, further comprising

dividing a photodetector into at least two light receiving sections in a radial direction; and generating the radial push-pull signal from a difference between light receiving signals from a disk and received by the at least two light receiving sections, wherein the disk comprises one of a first disk and a second disk.

14. (PREVIOUSLY PRESENTED) The method as recited in claim 13, further comprising

receiving the magnitude of the phase difference and the light receiving signals and outputting servo error signals;

using the servo error signals to output a voltage to drive a spindle motor of the disk.

15. (PREVIOUSLY PRESENTED) The method as recited in claim 14, further comprising

generating a first track cross signal from an envelope of an RF SUM signal, wherein the RF SUM signal is obtained by adding the light receiving signals;

generating a second track cross signal from an envelope of the radial push-pull signal;
and

selectively outputting one of the first track cross signal and the second track cross signal according to the distinguishing of the first disk from the second disk.

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20. (CURRENTLY AMENDED) An apparatus determining a type of disc in an optical disc recording/reproducing device comprising a photodetector divided into at least two light receiving sections in a radial direction, comprising:

a radial subtractor generating a radial push-pull signal from a difference between light receiving signals from a disk and received by the at least two light receiving sections, wherein the disk comprises one of a first disk and a second disk;

an upper envelope detector detecting an upper envelope signal from the radial push-pull signal;

a lower envelope detector detecting a lower envelope signal from the radial push-pull signal;

a phase comparator detecting a phase difference between the upper envelope signal and the lower envelope signal; and

a type of disk determiner distinguishing the first disk from the second disk according to a magnitude of the phase difference and outputting a signal indicative thereof, wherein the second disk comprises a density higher than the first disk.

21. (PREVIOUSLY PRESENTED) The apparatus as recited in claim 20, wherein the radial push-pull signal is an RF signal.

22. (PREVIOUSLY PRESENTED) The apparatus as recited in claim 20, wherein the type of disk determiner determines the first disk if the phase difference is greater than or equal to a reference phase difference.

23. (PREVIOUSLY PRESENTED) The apparatus as recited in claim 20, wherein the type of disk determiner determines the second disk if the phase difference is less than a

reference phase difference.

24. (PREVIOUSLY PRESENTED) The apparatus as recited in claim 20, further comprising

a servo error generator and servo controller receiving the magnitude of the phase difference and the light receiving signals and outputting servo error signals;

a servo driver amplifier receiving the servo error signals to output a voltage to drive a spindle motor of the disk.

25. (PREVIOUSLY PRESENTED) The apparatus as recited in claim 20, further comprising a first comparator comparing the upper envelope signal with a predetermined threshold and binarizing the upper envelope signal prior to detecting the phase difference.

26. (PREVIOUSLY PRESENTED) The apparatus as recited in claim 20, further comprising a second comparator comparing the lower envelope signal with a predetermined threshold and binarizing the lower envelope signal prior to detecting the phase difference.

27. (PREVIOUSLY PRESENTED) The apparatus as recited in claim 20, further comprising

a first track cross signal generator generating a first track cross signal from an envelope of an RF SUM signal, wherein the RF SUM signal is obtained by adding the light receiving signals;

a second track cross signal generator generating a second track cross signal from an envelope of the radial push-pull signal; and

a switch selectively outputting one of the first track cross signal and the second track cross signal according to the output signal from the type of disk determiner.

28. (PREVIOUSLY PRESENTED) An apparatus, comprising:

a phase comparator detecting a phase difference between an upper envelope signal and a lower envelope signal from a radial push-pull signal, wherein the radial push-pull signal is a difference between at least two light receiving signals from a disk and received by at least two light receiving sections in a photodetector, wherein the disk comprises one of a first disk and a second disk; and

a type of disk determiner distinguishing the first disk from the second disk according to a

magnitude of the phase difference and outputting a signal indicative thereof, wherein the second disk comprises a density higher than the first disk.

29. (PREVIOUSLY PRESENTED) The apparatus as recited in claim 28, wherein the type of disk determiner determines the first disk if the phase difference is greater than or equal to a reference phase difference.

30. (PREVIOUSLY PRESENTED) The apparatus as recited in claim 28, wherein the type of disk determiner determines the second disk if the phase difference is less than a reference phase difference.

31. (PREVIOUSLY PRESENTED) The apparatus as recited in claim 28, further comprising

a first track cross signal generator generating a first track cross signal from an envelope of an RF SUM signal, wherein the RF SUM signal is obtained by adding the light receiving signals;

a second track cross signal generator generating a second track cross signal from an envelope of the radial push-pull signal; and

a switch selectively outputting one of the first track cross signal and the second track cross signal according to the output signal from the type of disk determiner.

32. (PREVIOUSLY PRESENTED) An apparatus, comprising:

a type of disk determiner obtaining a magnitude of a phase difference between an upper envelope signal of a radial push-pull signal and a lower envelope signal of the radial push-pull signal and determining therefrom the type of disk and outputting a signal indicative thereof.

33. (PREVIOUSLY PRESENTED) The apparatus as recited in claim 32, further comprising

a photodetector divided into at least two light receiving sections in a radial direction; and

a radial push-pull signal generator generating the radial push-pull signal from a difference between light receiving signals generated by the at least two light receiving sections.

34. (PREVIOUSLY PRESENTED) The apparatus as recited in claim 33, further comprising

an upper envelope detector detecting the upper envelope signal from the radial push-pull signal; and

a lower envelope detector detecting the lower envelope signal from the radial push-pull signal.

35. (PREVIOUSLY PRESENTED) The apparatus as recited in claim 34, further comprising

a servo error generator and servo controller receiving the magnitude of the phase difference and the light receiving signals and outputting servo error signals;

a servo driver amplifier receiving the servo error signals to output a voltage to drive a spindle motor of the disk.

36. (PREVIOUSLY PRESENTED) The apparatus as recited in claim 35, further comprising

a first track cross signal generator generating a first track cross signal from an envelope of an RF SUM signal, wherein the RF SUM signal is obtained by adding the light receiving signals;

a second track cross signal generator generating a second track cross signal from an envelope of the radial push-pull signal; and

a switch selectively outputting one of the first track cross signal and the second track cross signal according to the output signal from the type of disk determiner.

37. (PREVIOUSLY PRESENTED) The apparatus as recited in claim 32, wherein the type of disk is one of a first disk and a second disk, wherein the second disk comprises a higher density than the first disk.

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